

**Listed Waterbody:** Watsonville Sloughs**Listed Condition:** Pesticides (unspecified)

**Designated Beneficial Uses:** Contact and Non-contact Recreation (REC-1 and REC-2), Wildlife Habitat (WILD), Warm Freshwater Habitat (WARM), Estuarine Habitat (EST), Preservation of Biological Habitats of Special Significance (BIOL), Spawning Reproduction and/or Early Development (SPWN), Shellfish Harvesting (SHELL), Commercial and Sport Fishing (COMM), and Rare, Threatened, or Endangered Species habitat (RARE)

**Watershed Location:** Southwestern portion of Santa Cruz County, mouth of Pajaro River

**Year added to California's CWA Section 303(d) List of Impaired Waters - 1994**

**Preliminary Schedule for Watsonville Sloughs – Pesticides Impairment Investigation project**

Task	Completion Date	Notes
Project Plan	May 2004	
Data Collection and Analysis-Progress Report	January 2005	* contact staff to submit data
Preliminary Project Report	March 2005	
Final Project Report and Recommendation for Regulatory Action (as needed)	FY2005-2006	

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**Problem Background:**

**Basis of Listing:** Regional Board files indicate that the Watsonville Slough system was placed on California's 303(d) List of Impaired Waters for Pesticide impairment based on 1980s State Mussel Watch (SMW) data. Looking at SMW data, one finds 1988 samples from Harkins Slough showing:

- dieldrin (in tissue up to about 600 ppb compared to a FDA action level of 300 ppb), and
- DDT (in tissue up to about 3700 ppb compared to a NAS guideline of 1000 ppb)

Results from 1992-93 SMW monitoring (conducted at the lower end of Watsonville Slough) found these two chemicals present, but at levels below the FDA and NAS guidance values. It is worth noting that the 1988 samples were mostly whole-body tissue samples. Filet tissue portions (more closely reflecting tissue eaten by humans) collected in 1988 in Watsonville Slough upstream of Harkins Slough were below those FDA and NAS guidelines. However, current practice uses different guidance values than the FDA and NAS guidance values used in 1993. The current guidance values – which are generally lower than the FDA and NAS numbers – were exceeded for Dieldrin and DDT in the 1988 filet samples. Table 1 at the end of this Project Plan presents a summary of 1988 and 1993 tissue data compared against current guidance values.

**Recent Data:** An academic study published in 1999 (Hunt et al, 1999) described aquatic toxicity in the lower portions of the Watsonville Slough system and reported a limited amount of 1994/95 water sampling data. The data show DDT and dieldrin were present at levels below the current (2004, California Toxics Rule of 2000) freshwater criterion maximum concentration. Limited other data about pesticides in the water column are available from the files of the Pajaro Valley Water Management Authority (PVWMA). The PVWMA typically collects and analyzes two water samples per year from the vicinity of the Watsonville Slough and Harkins Slough

confluence, and the RB3 staff collected two sets of samples from throughout the slough system in 2002. In general, no significant amounts of pesticides have been detected in the water column in these samples from 1996–2003 (less than 2 ug/L of chlorpropham, diuron and fenuron were detected in various RB3 2002 samples, with one sample showing 25 ug/L of chlorpropham). See Table 2 attached to this project plan for a summary of the RB3 2002 sample data.

It is worth noting that what appeared to be the most impaired area in 1988 (the Harkins Slough drainage), has subsequently been put into a conservation easement, is no longer used for crops (and therefore sees less pesticide use, if any), and, based on the PVWMA data, is not showing any pesticides present in the water column. In 2002, the State Mussel Watch (or Toxic Substances Mon. Program ??) collected samples from Watsonville Sloughs and reporting of those results is anticipated soon (summer 2004). This newer data may shed additional light on the possibility that Harkins Slough, or even all of Watsonville Slough, is no longer receiving significant amounts of pesticide inputs, and whether the listed impairment may primarily be due to “legacy” pesticides which persist in the environment and degrade at relatively slow rates. In addition, new data or information may become available from a Prop. 13 grant awarded to Santa Cruz County in 2003 which includes tasks related to partial restoration of Watsonville Slough (see Bill Arkfeld, RWQCB Prop. 13 grant manager for details of the grant’s proposed workplan).

**Project Plan:** Below is a brief overview of the project steps that can currently be projected. Our current projection is that, because the “legacy” pesticides DDT and dieldrin (both of which are no longer produced or sold within the region) appear to be the only impairment in the slough this project will be moved to a low priority while additional monitoring data is collected. We anticipate that within ten years, monitoring data may indicate that beneficial uses are attained and Watsonville Slough – Pesticides may be appropriate for delisting.

### **Phase 3. Data Collection and Analysis:**

Who	Regional Board (RB) staff – project lead scientist State Mussel Watch– sediment and mussel samples collected in summer 2002, awaiting lab result transmittals to RB staff
Action Steps & Schedule	<ul style="list-style-type: none"> <li>• Spring 2004: -RB staff visit Pajaro Valley Water Management Agency staff offices and collect available pesticide sampling data from the agency’s files (water column samples, roughly twice per year since 1996); update file data collected in 2002</li> <li>• Sept. 2004 – January 2005: -RB staff review results of 2002 SMW tissue and sediment samples, and write Project Data Collection Progress Report summarizing data collection and evaluation.</li> </ul>
Cost (PY & \$)	<u>Staff Resources:</u> – Fiscal Year 04-05 allocation= 0.1 Personnel Years (PY); <u>Contract Resources:</u> = no RB3 contract money (RB sampling done 2002); <u>Other:</u>
Issues	Based on preliminary information, it appears that the issue may be one of “legacy pesticides” in sediments which are degrading. DDT (and its’ degradation products DDD & DDE) and dieldrin may be the only remaining pesticide impairment in the slough and, as legacy pesticides no longer produced or used in the area, these can be expected to continue to decay to acceptable levels. Also, recent conservation easements in the slough system (e.g., Harkins Slough) may also serve to reduce future pesticide inputs into the sloughs. The overall evaluation will be described in the Data Analysis Progress Report and future planned activities (e.g., move to low priority due to only impairment being “legacy” pesticides and conduct additional monitoring to confirm that pesticides are degrading to levels where beneficial use is restored and delisting is appropriate).

**Phase 4. Project Analysis**

Who	Regional Board staff – project lead scientist Stakeholders – see stakeholder plan section below
Action Steps & Schedule	<ul style="list-style-type: none"> <li>Jan. - June 2004 – staff evaluates NOAA sediment guidance values, OEHHA tissue guidance values, and USEPA tissue screening values as potential indicators of when the pertinent narrative objectives are being achieved. Select numeric targets and include summary of numeric targets in written Preliminary Project Report (due March 2005).</li> <li>January - March 2005 – Evaluate existing data to determine where targets are being exceeded and use data to determine potential source areas causing exceedences; complete Preliminary Project Report which may include a TMDL, Source Analysis, and Numeric Targets as part of overall data analysis.</li> </ul> <p><b>Stakeholder Plan:</b> The purpose of initiating stakeholder involvement at this point in the project is to obtain buy-in to the project approach selected and described in the Preliminary Project Report (and making timely use of existing stakeholder group assembled for Prop. 13 grant activities and updates).</p> <ul style="list-style-type: none"> <li>July– October 2005 – present draft Preliminary Project Report either in verbal or written form to stakeholder group (the Watsonville Sloughs workgroup set up by Santa Cruz County - Donna Bradford, lead contact)- note timing lengthened because group may not meet much in summer months</li> </ul> <p>The Preliminary Project Report will describe current conditions with respect to pesticides in the sloughs and what next step(s) are anticipated to address the pesticide impairment listing.</p>
Cost (PY & \$)	<p><u>Staff Resources:</u> – FY 04-05 = 0.0 PY (included in effort for Data Collection and Analysis Phase) FY 05-06 = 0.1 PY (projected)</p> <p><u>Contract Resources:</u></p> <p><u>Other:</u></p>
Issues	

**Budget and Schedule Uncertainties:***Budget:**Schedule:*

**TABLE 1. Watsonville Slough- Pesticides: Tissue Data Summary (TSM program)**

Site: Harkins slough/ u/s Watsonville Slough (305.10.04) – **WHOLE BODY** data, “STB” species (stickleback?– not defined in Code Key of 1991 report; is Threespine Stickleback in 1995 report)

Chemical	1988-89 ppb, wet wgt tissue	1992-93 ppb, wet wgt tissue	Comparison value (CV)	CV source (Reference, as listed in P. Kozelka’s PDQ fish SVs Table)
Chlordane	70.4/67.6		30	Cal-OEHHA, 1999
Chlorpyrifos	ND/ND		1200	USEPA-Recreational Fish
Dacthal	8.8/9.1		--	
Dieldrin	<b>620.0/580.0</b>		2.0	Cal-OEHHA, 1999
DDD	--			
DDE	--			
DDT (total)	<b>3799.0/ 3528.0</b>		100	Cal-OEHHA, 1999
Diazinon	ND/63		300	Cal-OEHHA, 1999
Endosulfan (total)	412.0/372.0		20,000	Cal-OEHHA, 1999
Endrin	16/18		1000	Cal-OEHHA, 1999
Ethion	--		2000	Cal-OEHHA, 1999
Heptachlor epoxide	ND*/14		4.0	Cal-OEHHA, 1999
Lindane (gamma-HCH)	ND/ND		30	Cal-OEHHA, 1999
Toxaphene	<b>930.0/820.0</b>		30	Cal-OEHHA, 1999

Note: results separated by a slash (“ / ”) are duplicate samples from same site and same date, NAS values are more appropriate for Whole Body comparisons, however few NAS guidelines exist for these chemicals

Site: Watsonville Slough-Lee Rd. (u/s of Harkins Sl, near Hwy 1) (305.10.07) – fillet data, Sacramento Blackfish species (SBF)

Chemical	1988-89 ppb, wet wgt tissue	1992-93 ppb, wet wgt tissue	Comparison value (CV)	CV source (Reference, as listed in P. Kozelka’s PDQ fish SVs Table)
Chlordane	6.0		30	Cal-OEHHA, 1999
Chlorpyrifos	ND		1200	USEPA-Recreational Fish
Dacthal	ND		--	
Dieldrin	<b>11.0</b>		2.0	Cal-OEHHA, 1999
DDD	110		in DDT	
DDE	430		in DDT	
DDT (total)	<b>560</b>		100	Cal-OEHHA, 1999
Diazinon	ND		300	Cal-OEHHA, 1999
Endosulfan (total)	199		20000	Cal-OEHHA, 1999
Endrin	ND		1000	Cal-OEHHA, 1999
Ethion	--		2000	Cal-OEHHA, 1999
Heptachlor epoxide	ND*		4.0	Cal-OEHHA, 1999
Lindane (gamma-HCH)	ND		30	Cal-OEHHA, 1999
Toxaphene	ND*		30	Cal-OEHHA, 1999

Cal- OEHHA, 1999 = Cal. OEHHA Lakes Study, Table 3, June 1999.

\*= detection limit not as low as CV (DL= 5.0 for Heptachlor epoxide; DL = 100 for toxaphene).

**Site:** Watsonville Slough/Estuary (305.10.00) – fillet data, Pacific Staghorn Sculpin species (STG)

Chemical	1988-89 ppb, wet wgt tissue	1992-93 ppb, wet wgt tissue	Comparison value	CV source (Reference, as listed in P. Kozelka's PDQ fish SVs Table)
Chlordane		ND	30	Cal-OEHHA, 1999
Chlorpyrifos		ND	1200	USEPA-Recreational Fish
Dacthal		ND	--	
Dieldrin		16.0	2.0	Cal-OEHHA, 1999
DDD			in DDT	
DDE			in DDT	
DDT (total)		257	100	Cal-OEHHA, 1999
Diazinon		ND	300	Cal-OEHHA, 1999
Endosulfan (total)		ND	20,000	Cal-OEHHA, 1999
Endrin		ND	1000	Cal-OEHHA, 1999
Ethion		ND	2000	Cal-OEHHA, 1999
Heptachlor epoxide		ND*	4.0	Cal-OEHHA, 1999
Lindane (gamma-HCH)		ND	30	Cal-OEHHA, 1999
toxaphene		ND*	30	Cal-OEHHA, 1999

Cal- OEHHA, 1999 = Cal. OEHHA Lakes Study, Table 3, June 1999.

\*= detection limit not as low as CV (DL= 5.0 for Heptachlor epoxide; DL = 100 for toxaphene).

**RB3- 2002 Sampling Results Summary**

<b>Site</b>	<b>Site Code</b>	<b>diuron (ug/L)</b>	<b>fenuron (ug/L)</b>	<b>chlorpropham (ug/L)</b>
Comparison Value †		14 for DrWtr- R5 4300=low LC50#	None found	8000 – lowest LC50 reported#
<b>2/13/02 samples</b>				
Watsonville Slough Lagoon	305WSL	0.064*	0.41*	ND (mdl= 0.3379)
Beach Street Ditch (prior to flow into Wats. Slough)	305BSD	0.13*	0.27*	ND (mdl= 0.3379)
Watsonville Slough @ Shell Road pump station	305WAT	0.052*	0.37*	ND (mdl= 0.3379)
Watsonville Slough @ San Andreas Rd (u/s of bridge)	305WSH	0.098*	0.37*	ND (mdl= 0.3379)
Harkins Slough (above entry into Wats. Slough)	305HGS	0.035*	ND, mdl= 0.2107	ND (mdl= 0.3379)
Harkins Slough @ Harkins Slough Road	305HAR	ND mdl= 0.0306	ND, mdl= 0.2107	25
Watsonville Slough @ Lee Road	305WSW	ND mdl= 0.0306	1.7	ND (mdl= 0.3379)
Watsonville Slough @ Harkins Slgh Rd (intown)	305WSE	0.12*	0.48*	1.1
Harkins Slough (Upper) – Larkin Valley (@ Buena Vista Road bridge)	305WLV	ND mdl= 0.0306	ND, mdl= 0.2107	ND (mdl= 0.3379)
Struve Slough @ Lee Road	305SSW	0.38*	ND, mdl= 0.2107	ND (mdl= 0.3379)
Struve Slough @ Harkins Slough Rd (intown, near shopping plaza/hotel)	305SSE	ND mdl= 0.0306	0.30*	ND (mdl= 0.3379)
<b>5/6/02 samples</b>				
Watsonville Slough Lagoon	305WSL	0.071*	0.38*	ND
Beach Street Ditch (prior to flow into Wats. Slough)	305BSD	ND	ND	ND
Watsonville Slough @ Shell Road pump station	305WAT	0.039*	ND	2.4
Watsonville Slough @ San Andreas Rd (above bridge)	305WSH	0.11*	0.50*	ND
Harkins Slough (above Watsonville Slough)	305HGS	ND	ND	ND
Harkins Slough @ Harkins Slough Road	305HAR	ND	ND	2.1
Watsonville Slgh @ Lee Rd	305WSW	ND	ND	ND
Watsonville Slough @ Harkins Slgh Rd (intown)	305WSE	0.13*	0.69*	ND
Harkins Slough (Upper) – Larkin Valley (@ Buena Vista Road bridge)	305WLV	ND	ND	ND

Struve Slough @ Lee Road	305SSW	ND	ND	ND
Struve Slough @ Harkins Slough Rd (intown, near shopping plaza/hotel)	305SSE	ND	ND	ND

† = available or applicable criterion for comparison

# = lowest value for LC50 reported in “Agrochemicals Desk Reference- 2<sup>nd</sup> ed.” By J.H. Montgomery, 1997, Lewis Publishers/CRC Press.

\* = tentative reported value, value between mdl and pql; only values above the pql are certified as actual detections – confirmed detections are shown in light shaded boxes

Samples collected by: D. Gouzie and D. Roques

‡ = PVWMA samples Harkins Slough just above Watsonville Slough, about 2 times per year for total metals and pesticides; data from 1996 – 1999 show all pesticides ND with satisfactory detection limits

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